



CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMP NUMBER: YR001

DATE VERIFIED: April 6, 2012

QUALITY ASSURANCE TECHNICIAN:

Leah Hardenbergh

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

DATE: March 10, 2010
TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
FROM: Jo Anna Ripley, Stormwater
PO: 270712
RE: Files Approved for Scanning

General File ID or BMP ID: YR001

PIN: 1430300010B

Subdivision, Tract, Business or Owner

Name (if known):

Bedell, Kevin R

Property Description:

Lot 10B RL Banks Estate

Site Address:

4622 Rochambeau Drive

(For internal use only)

Box 9

Drawer: 5

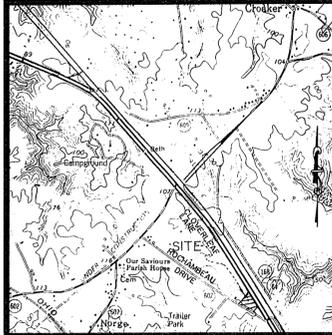
Agreements: (in file as of scan date)

N

Book or Doc#:

Page:

Comments
Medical practice



VICINITY MAP
SCALE: 1"=2000'

- NOTES:
- 1) ALL UTILITIES SHALL BE PLACED UNDERGROUND.
 - 2) EACH PARKING SPACE SHALL BE DESIGNATED BY PAVEMENT STRIPS OR MARKS ON THE CURBING.
 - 3) PARKING REQUIREMENTS SHALL MEET SECTION 20-12.D. (K) OF THE ZONING ORDINANCE. THIS SECTION INDICATES THAT MEDICAL AND DENTAL CLINICES SHALL PROVIDE AT LEAST THREE (3) PARKING SPACES FOR EACH DOCTOR OR DENTIST HAVING OFFICES IN SUCH CLINIC.
 - 4) CONSTRUCTION OF THE INFILTRATION BASIN WILL BE DELAYED UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.
 - 5) THE INFILTRATION BASIN SHALL BE EXCAVATED WITH LIGHT EQUIPMENT, EQUIPPED WITH TRACKS OR OVERSIZED TIRES TO MINIMIZE COMPACTION OF THE UNDERLYING SOILS. AFTER THE BASIN IS EXCAVATED TO THE FINAL DESIGN ELEVATION, THE FLOOR SHALL BE DEEPLY TILLED WITH A ROTARY TILLER TO RESTORE INFILTRATION RATES, FOLLOWED BY A PASS WITH A DRAG. VEGETATION SHALL BE ESTABLISHED IMMEDIATELY.
 - 6) TRASH REMOVAL TO BE HANDLED BY TRASH CANS.
 - 7) AREA DEDICATED AS NATURAL OPEN SPACE IS TO REMAIN ON SUCH A STATE PERMANENTLY.
 8. ALL RESTROOM AND LAVATORY FACILITIES, EXCEPT FOR THOSE LOCATED IN PATIENTS' EXAM ROOMS, SHALL BE EQUIPPED WITH KOHLER MODEL 3420 OR COMPARABLE TOILETS AND SPRING LOADED FAUCETS AND WATER-SAVER SHOWER HEADS.

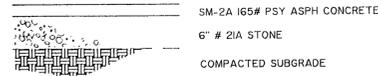
STATISTICAL INFORMATION

ZONING	A-1
TAX MAP & PARCEL	(14-3)(10B)
AREA	1.20 Ac.
BUILDING AREA	4100 SQ. FT. (8%)
1ST FLOOR MEDICAL CLINIC	2560 SQ. FT.
1ST FLOOR FOYER	98 SQ. FT.
2ND FLOOR OFFICE	1442 SQ. FT.
PAVED AREA	0.16 Ac. (13%)
OPEN AREA	0.95 Ac. (79%)
HEIGHT BUILDING	35' (MAX)
WATER	PRIVATE WELL
SEWER	PRIVATE DRAINFIELD
PARKING SPACES REQD.	9 SPACES
PARKING SPACES	13 SPACES
H/C PARKING SPACES	1 SPACE
TOTAL PARKING SPACES	14 SPACES

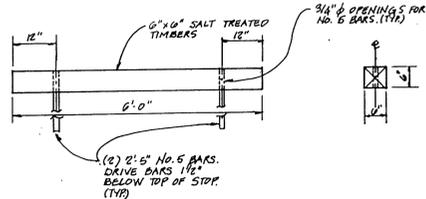


Rickmond Engineering, Inc.
 Civil Engineering
 Environmental Engineering
 Land Surveying
 1643-C Main Street, Trail
 Williamsburg, VA 23185
 (804)229-1776 or 898-4149

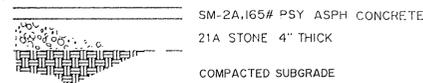
Job No.: 90186
 Date: 11/1/90
 Scale: 1"=20'
 Approved By: RCS
 Drawn By: KJM
 Designed By: KJM



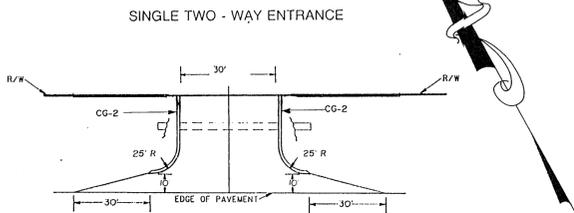
ENTRANCE SECTION
(WITHIN VDOT RIGHT-OF-WAY)



WOODEN BUMPER DETAIL



PAVEMENT SECTION
(WITHIN PROPERTY LINES)

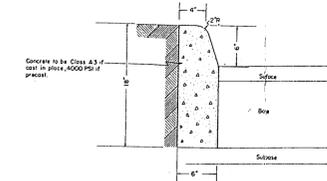
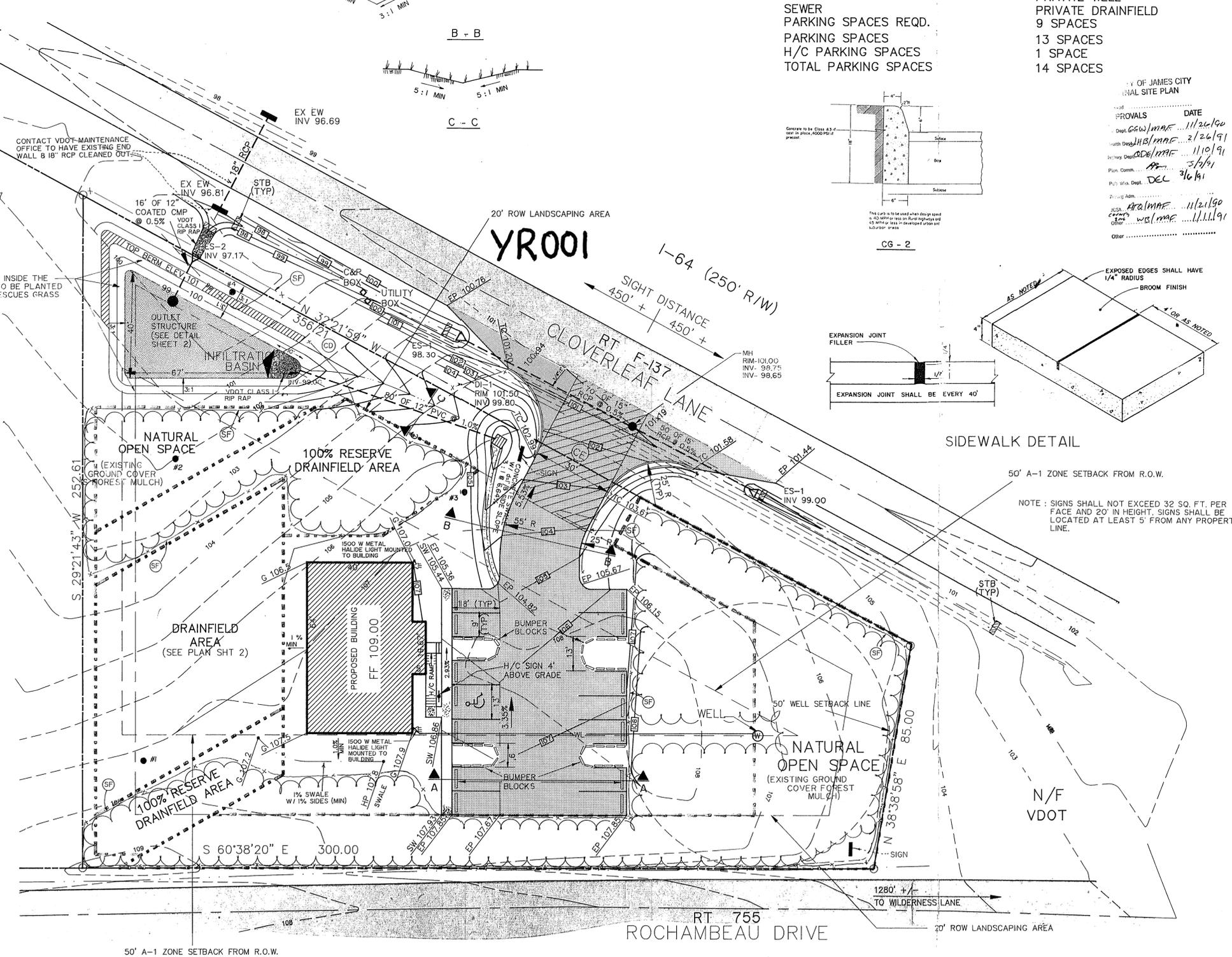


ENTRANCE DETAIL

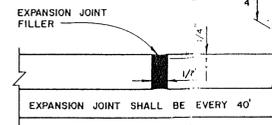
OWNER/DEVELOPER
 DR. KEVIN BEDELL
 3307 POPLAR CREEK LANE
 WILLIAMSBURG, VA 23188

LEGEND

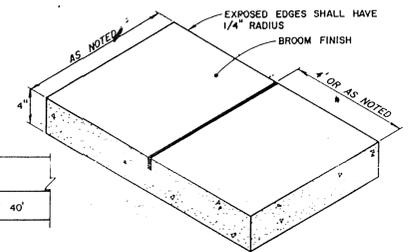
- BOUNDARY NATURAL OPEN SPACE
- BOUNDARY RESERVE DRAINFIELD
- BOUNDARY DRAINFIELD



CG - 2



EXPANSION JOINT SHALL BE EVERY 40'



SIDEWALK DETAIL

50' A-1 ZONE SETBACK FROM R.O.W.
 NOTE: SIGNS SHALL NOT EXCEED 32 SQ. FT. PER FACE AND 20' IN HEIGHT. SIGNS SHALL BE LOCATED AT LEAST 5' FROM ANY PROPERTY LINE.

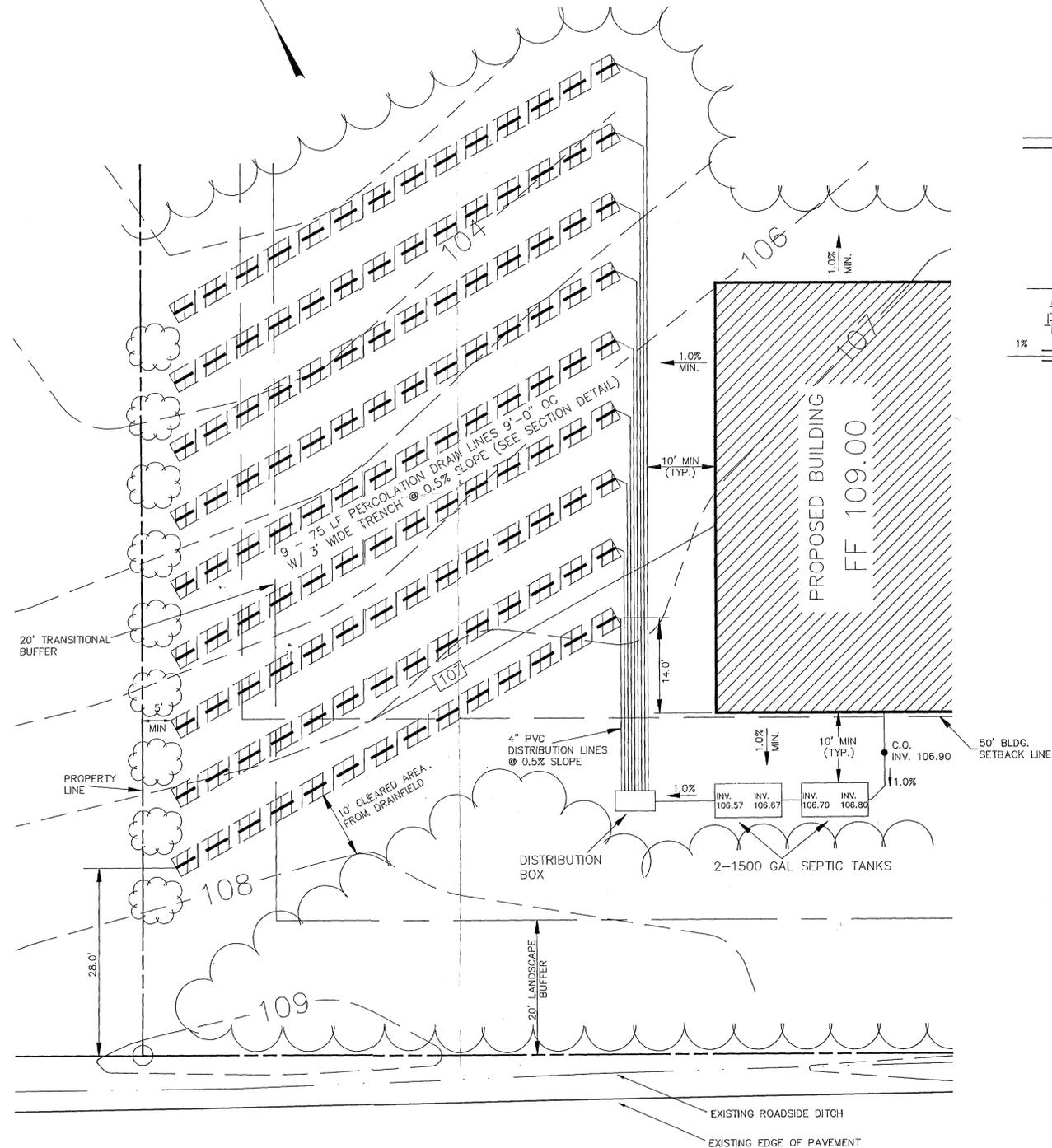


No.	By	Date	App.	Revision
2	DPB	REV PER HEALTH DEPT. COMMENTS TELECON. 1/9/91	RCS	12/18/90
1	DPB	REV PER COUNTY COMMENTS LTR. DTD 12/14/90	RCS	12/18/90

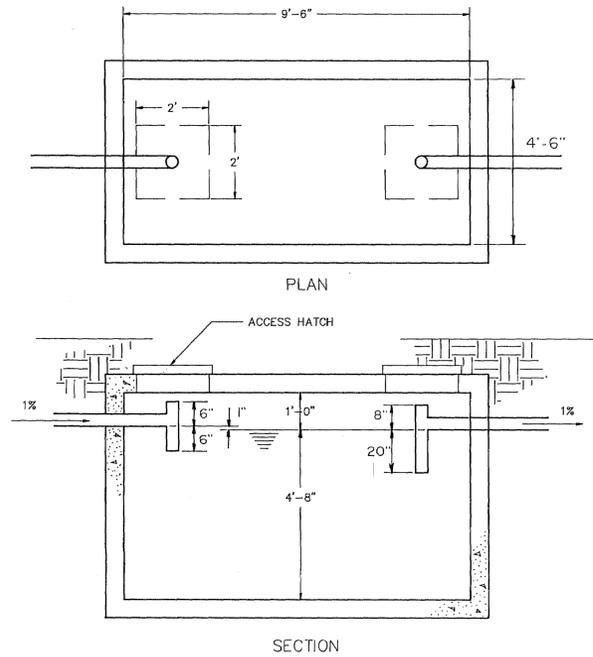
**DR. KEVIN BEDELL'S
 MEDICAL FACILITY**
 SITE PLAN

Job Number: 90186
 Sheet No.: 1

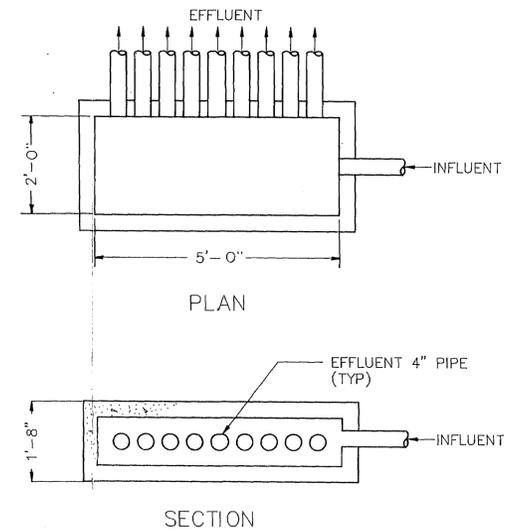
NOTE:
 ALL RESTROOM AND LAVATORY FACILITIES, EXCEPT FOR THOSE LOCATED IN PATIENTS EXAM ROOMS SHALL BE EQUIPPED WITH KOHLER MODEL 3420 OR COMPARABLE TOILETS AND SPRING LOADED FAUCETS AND WATER-SAVER SHOWER HEADS.



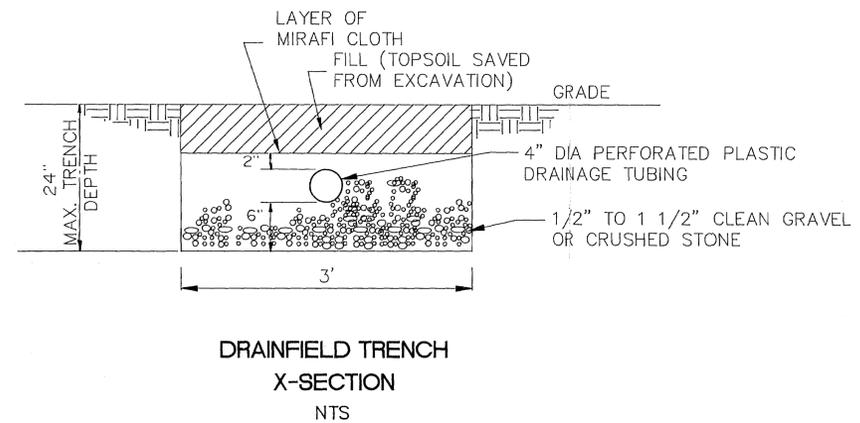
DRAINFIELD PLAN
 SCALE: 1"=10'



1500 GAL SEPTIC TANK
 NTS



DISTRIBUTION BOX
 NTS



DRAINFIELD TRENCH
 X-SECTION
 NTS

Rickmond Engineering, Inc.
 Civil Engineering
 Environmental Engineering
 Land Surveying
 1643-C Merrimac Trail
 Williamsburg, VA 23185
 (804)229-1776 or 898-4149



No. By	Rev.	Per Health Dept. Comments	Telecon	Date
1	DBS	REV PER HEALTH DEPT. COMMENTS	TELECON 1/9/91	

DR. KEVIN BEDELL'S
MEDICAL FACILITY
 DETAIL SHEET

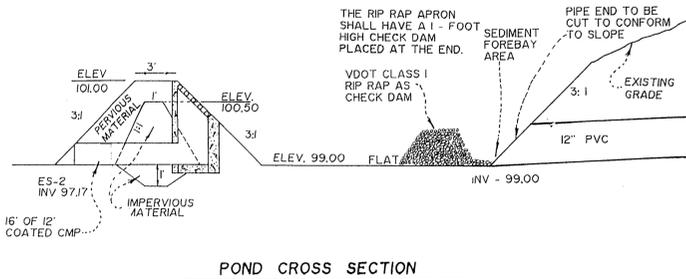
Job Number: 90186
 Sheet No.: 2

Designed By: KMJ
 Drawn By: KMJ
 Approved By: RCS
 Scale: AS NOTED
 Date: 11/17/90
 Job No.: 90186

VIRGINIA
 JAMES CITY COUNTY

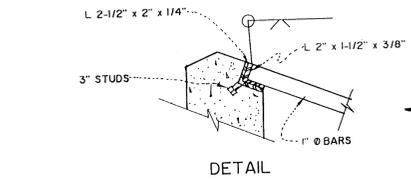
INFILTRATION BASIN CONSTRUCTION SPECIFICATIONS

- Before the development site is graded, the area planned for the basin shall be roped off to prevent heavy equipment from compacting the underlying soils.
- Construction of the basin shall not begin until after the site has been completely stabilized.
- The basin shall be excavated using light earth-moving equipment with tracks or oversized tires. Normal rubber tires shall be avoided since they compact the subsoil and reduce its infiltration capabilities. For the same reason, the use of bulldozers or front-end loaders shall be avoided. The floor of the basin shall be deeply tilled with a rotary tiller or disc harrow. Several passes with a leveling drag shall then be made to smooth out the basin floor.
- The basin shall be stabilized with vegetation immediately after construction. Use of low maintenance, rapid germinating grasses such as fescues shall be used. The condition of the newly established vegetation should be checked several times over the first two months, and any necessary remedial actions taken (e.g., reseeding, fertilization, and irrigation).

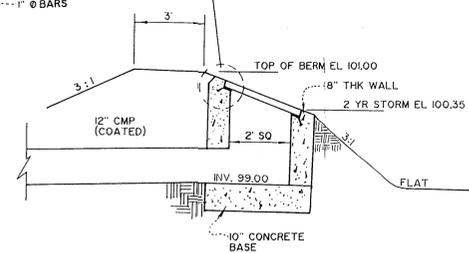


POND CROSS SECTION

YR001



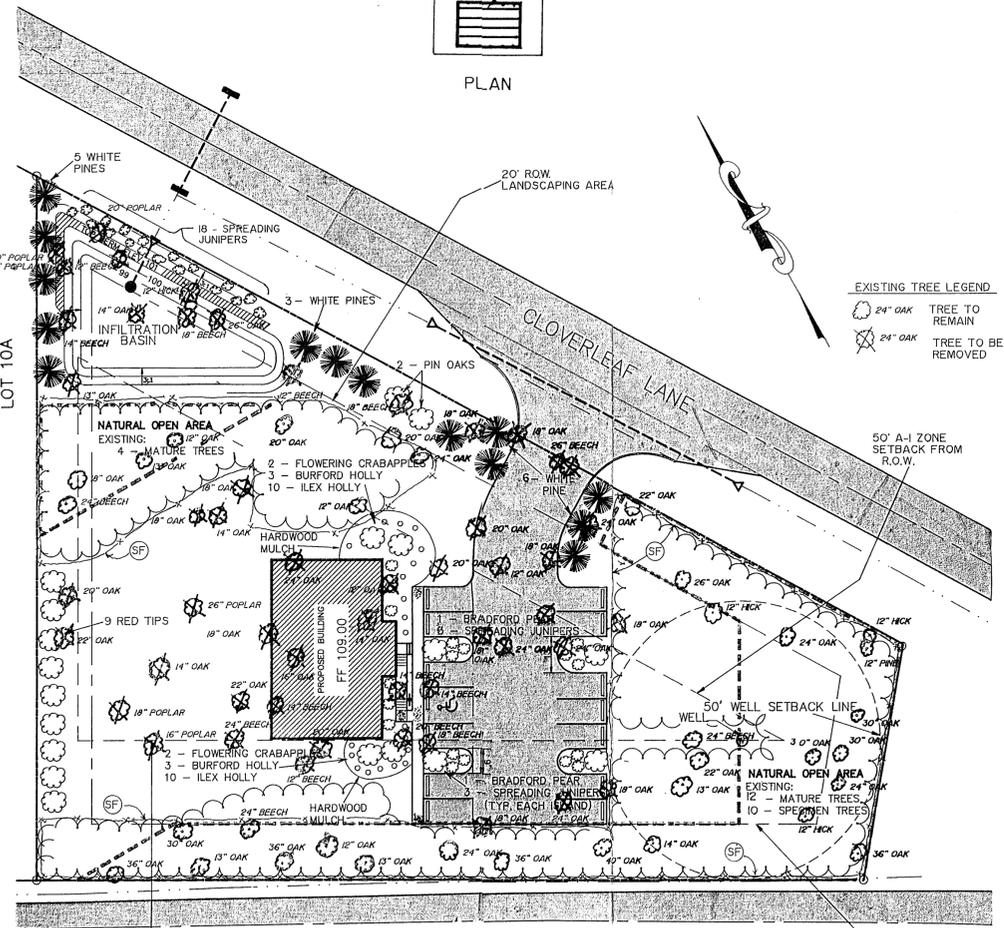
DETAIL



STRUCTURE SECTION



PLAN



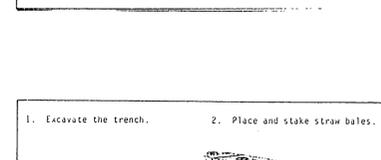
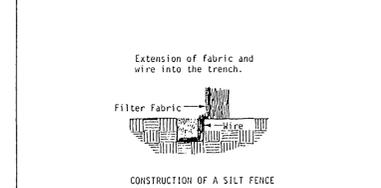
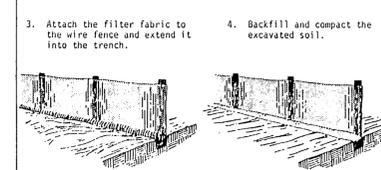
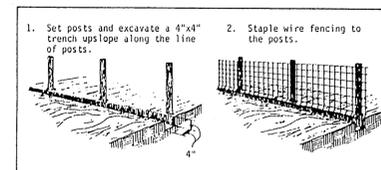
LANDSCAPE PLAN ROCHAMBEAU DRIVE
SCALE: 1"=30'

GENERAL NOTES

- All construction shall conform to current City/County and/or VDOT standards and specifications unless otherwise specified.
- Contractor shall secure the latest edition of the Virginia Erosion and Sediment Control Handbook and comply with all County requirements for erosion and sediment control.
- All cuts, vegetation and deleterious material encountered shall be removed and disposed of off site.
- Select material required for fill and backfill under parking lot, footings and structures. It shall be placed in layers not to exceed eight inches (8") in thickness and compacted to 95% of maximum density as determined by ASTM D-698.
- All concrete shall be Class A-3 air entrained (3000 P.S.I.).
- All green area, within limits of construction, to be topsoiled, fertilized and mulched.
- Contractor shall obtain at his own expense, any permit or bond if required by any government agency.
- Contractor shall be responsible for location, protecting and resolving any conflicts with existing utilities and shall repair, at his own expense, all utilities to be relocated or damaged by construction.
- Any errors or discrepancies shall be reported to the architect or the surveyor before proceeding with the work.
- Dewatering or excavation, if needed, is part of this contract.
- Before digging call Miss Utility of Virginia 1-800-552-7001.
- Contractor shall obtain permits from the State Highway Department prior to any work in the State's right-of-way. The contractor to restore and clean up the site to the satisfaction of Highway Department.
- Contractor must obtain all necessary building permits prior to construction.
- All restroom and lavatory facilities, except for those located in patients exam rooms, shall be equipped with Kohler Model 3420 or comparable toilets and spring loaded faucets and water-saver shower heads.

ROAD CONSTRUCTION NOTES

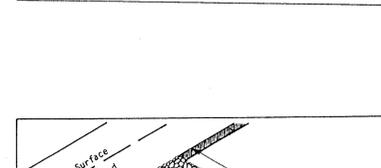
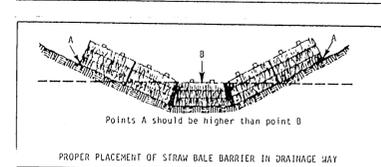
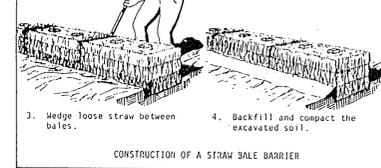
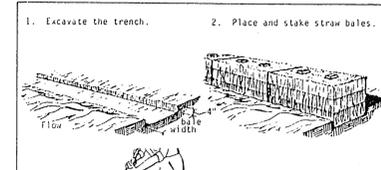
- The road contractor shall be responsible for coordinating all items on road work and drainage with existing and proposed underground utilities (power, water, sewer and telephone) such that no duplication of work effort is incurred.
- Upon completion, inspection and acceptance, all roads and drainage facilities shall be dedicated to the Virginia Department of Transportation for inclusion in the State secondary road system.
- All items of roadway and drainage necessary for the roads to be accepted into the State secondary road system, whether written on these plans or not are hereby expressly implied. No omissions, errors or over sight on the part of the engineer or owner shall detract from the contractor's responsibility of completing all items of roadway and drainage satisfactory in every respect to the City/County and the Virginia Department of Transportation.
- All erosion and sediment control measures shall be the responsibility of the road contractor.
- Lateral underdrains may be required where field conditions warrant. A change order for same will be executed if required by VDOT, the engineer, county or owner.



Extension of fabric and wire into the trench.

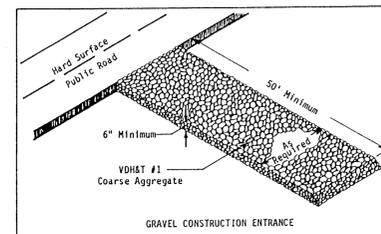
Filter Fabric

CONSTRUCTION OF A SILT FENCE



CONSTRUCTION OF A STRAW BALE BARRIER

PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY



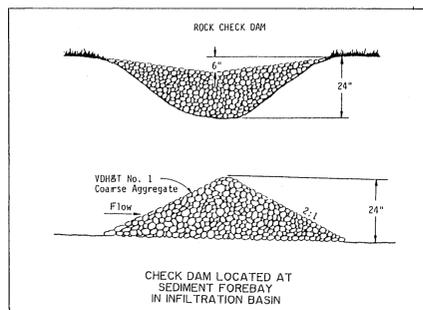
LANDSCAPING NOTES:

- ALL REQUIRED PLANTINGS SHALL CONFORM WITH THE MOST RECENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN STANDARD OF NURSERYMEN AND SHALL BE PLANTED IN ACCORDANCE WITH THE MOST RECENT EDITION OF GUIDELINES FOR PLANTING LANDSCAPE TREES AND PLANTING AND CARE OF TREES & SHRUBS PUBLISHED BY THE VIRGINIA COOPERATIVE EXTENSION SERVICE.
- A TEMPORARY FENCE OR BARRIER SHALL BE LOCATED & MAINTAINED OUTSIDE THE DRIPLINE OF ALL TREES TO BE PRESERVED BEFORE COMMENCEMENT OF CLEARING & GRADING. NO MATERIAL DEBRIS, FILL, VEHICLES, OR EQUIPMENT SHALL BE STORED WITHIN THE FENCE ENCLOSURE, NOR SHALL THE TOPSOIL LAYER BE DISTURBED.
- TREES & SHRUBS TO BE PLANTED SHALL BE IN ACCORDANCE WITH SECTIONS 20-14.2 a,b, AND 20-14.2 e,(3) OF THE ZONING ORDINANCE.
- A SHRUB SHALL BE DEFINED AS A LOW GROWING WOODY PLANT HAVING SEVERAL PERMANENT STEMS WHICH IS, AT PLANTING, 18 INCHES IF EVERGREEN OR 22 INCHES IF DECIDUOUS. A TREE SHALL BE DEFINED AS A SINGLE OR MULTIPLE SHADE TREE HAVING A MINIMUM CALIPER OF 1-1/2 INCHES AT PLANTING OR (b) AN EVERGREEN TREE AT LEAST EIGHT (8) FEET IN

Erosion and Sediment Control Notes

James City County
The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, appropriate modifications will be made to correct any plan deficiencies.

- All erosion and sediment control measures shall be installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook. The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
- All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways.
- Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dikes, ditches, and diversions must be seeded and mulched within 15 days of installation. An onsite pre-construction meeting will be held between the Office of Code Compliance and the contractor to identify those measures to be initially installed.
- Maintenance of all erosion and sediment control measures shall be accomplished in accordance with the Virginia Erosion and Sediment Control Handbook. Maintenance will include the repair of measures damaged by any subcontractor including those of the public utility companies. At the pre-construction meeting, the contractor will supply Code Compliance with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.
- Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Spec. A Spec. 1.16) shall be installed prior to the end of each working day.
- Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Office of Code Compliance approval will be required for other deviations from the approved plans.
- The contractor shall strip and pile topsoil at the locations shown on this plan or as directed by the engineer. Silt fence shall be placed at the toe of the stockpile after stripping of topsoil is complete.
- The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be installed immediately after construction of same. This includes installation of erosion control stone where required. Any drainage outfalls required for a street must be completed before street grading begins.
- Permanent or temporary soil stabilization must be applied to all denuded areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
- No more than 300' of sanitary sewer, storm sewer, or waterlines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).
- If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 1.75. Seeding will then take place as soon as the season permits.
- The term Seeding, Final Vegetative Cover or Stabilization, on this plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 1.66. Permanent Seeding, Irrigation shall be required as necessary to ensure establishment of grass cover.
- All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 1.75, Mulching and Manufacturer's Instructions.
- Inlet protection in accordance with Specification 1.08 shall be provided for all storm drain inlets as soon as practical following construction of same.
- Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
- Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3%.
- Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.
- Off-site waste or borrow areas shall be approved by the Office of Code Compliance prior to the import of any borrow or export of any waste to or from the project site.
- All paved and/or piped outfalls will be constructed before road grading and utility installation begins.



CONT.

HEIGHT, AND A MINIMUM CALIPER OF 1-1/4 INCHES IF SINGLE STEMMED AT PLANTING, OR EIGHT (8) FEET IN HEIGHT IF MULTI-STEMMED AT PLANTING. THE TERM TREE SHALL NOT INCLUDE ORNAMENTAL TREES AS DEFINED BELOW.

6) AN ORNAMENTAL TREE SHALL BE DEFINED AS A DECIDUOUS OR EVERGREEN TREE WHICH, IF SINGLE STEMMED IS EIGHT (8) FEET IN HEIGHT AND HAS A MINIMUM CALIPER OF 1-1/4 INCHES, AT PLANTING, OR IF MULTI-STEMMED HAS A HEIGHT OF EIGHT (8) FEET AT PLANTING.

Rickmond Engineering, Inc.
Civil Engineering
Environmental Engineering
Land Surveying
1643-C Merrimac Trail
Williamsburg VA 23185
(804) 228-1776 or 896-4149
Job No.: 90186
Date: 11/1/90
Scale: AS NOTED
Approved By: RCS
Designed By: KMJ
Drawn By: KMJ

COMMONWEALTH OF VIRGINIA
RALPH C. SIMMONS
No. 010289
PROFESSIONAL ENGINEER

No.	By	App.	Date
1	DFB	REV PER HEALTH DEPT. COMMENTS TELECON 1/9/91	1/10/91
2	DFB	REV PER COUNTY COMMENTS LTR DTD 12/14/90	12/19/90

DR. KEVIN BEDELL'S MEDICAL FACILITY
DETAIL SHEET
JAMES CITY COUNTY
Virginia

Job Number	90186
Sheet No.	3

Dr. Bedell's Medical Clinic

Stormwater Drainage and Management Calculations

Rickmond Engineering, Inc.

1643 Merrimac Trail, Suite C
Williamsburg, VA 23185
(804) 229-1776

November 16, 1990

RICKMOND ENGINEERING, INC.
 1643-C Merrimac Trail
 Williamsburg, Virginia 23185
 (804)229-1776

LOG OF BORINGS
 Bedell
 Project No. 90186
 Frank Hall

Hole#	Horizon	Depth	Texture	Description
(1)	A	0-4"	I	Dark grayish-brown (10yr4/2) loamy sand.
	E	4-16"	I	Brownish-yellow (10yr1/6) loamy sand.
	B1t	16-36"	II	Light yellowish-brown (10yr6/4) with yellowish-brown (10yr5/6) light sandy loam lamella.
	B2t	36-42"	II	Strong brown (7.5yr5/8) light sandy loam.
	BC	42-56"	II	Mottled brownish-yellow (10yr6/6), strong brown (7.5yr5/8) sandy loam with few very pale brown mottles.
	C1	56-60"	I	Yellow (10yr8/6), brownish-yellow (10yr6/8) sand.
	(2)	A	0-3"	I
E		3-20"	I	Brownish-yellow (10yr6/6) loamy sand.
B1t		20-38"	II	Brownish-yellow (10yr6/8) light sandy loam.
B2t		38-56"	II	Brownish-yellow (10yr6/8) sandy loam.
BC		56-60"	II	Brownish-yellow (10yr6/8) heavy sandy loam with few very pale brown (10yr7/3).
(3)	A	0-3"	I	Dark grayish-brown (10yr4/2) loamy sand.

Hole#	Horizon	Depth	Texture	Description
	E	3-14"	I	Light yellowish-brown (10yr6/4) loamy sand.
	EB	14-34"	I	Light yellowish-brown (10yr6/4) loamy sand with few yellowish-brown (10yr6/6), light sandy loam lamella.
	B1t	34-38"	II	Strong brown (7.5yr5/6) sandy loam.
	BC	38-42"	II	Strong brown (7.5yr5/6) light sandy loam.
	C1	42-46"	I	Reddish-yellow (7.5yr6/8) loamy sand.
	C2	46-60"	I	Mottled yellow (10yr8/6), very pale brown (10yr7/3) sand with strong brown (7.5yr5/6) sandy loam lamella.
(4)	A	0-4"	I	Dark grayish-brown (10yr4/2) loamy sand.
	E	4-18"	I	Light yellowish-brown (10yr6/4) loamy sand.
	C1	18-56"	I	Mottled yellow (10yr8/6), very pale brown (10yr7/3) with few strong brown (10yr5/6) light sandy loam lamella.
	C2	56-60"	I	White sand (10yr8/2) (wet).

TABLE OF CONTENTS

	<u>Page</u>
Preface	i
Pre-development Conditions	1
Post-development Conditions	5
Q-out for Infiltration Basin	9
Stage-Storage	10
Outlet Pipe	11
BMP Point System	12
BMP Work Sheet	13
Entrance Culvert	14

PREFACE

The following drainage calculations pertain to Dr. Kevin Bedell's Medical Facility located in James City County, Virginia.

The site currently consists of 1.20 acres of wooded land sloping toward to northwest property corner. The underlying soils is Kenansville (soil group A). The developed site will consist of a 2,600 square foot office building with a parking lot (14 spaces), sidewalk, and landscaping.

The 2 year storm will be controlled by an infiltration basin located at the northwest corner of the property. The 10 year storm will pass through an outlet structure to an existing culvert off-site.

To obtain a 10-point BMP as required by James City County 26% of the site has been dedicated as natural open space and 68% of the site is served by an infiltration basin (design 10).

Worksheet 2: Runoff curve number and runoff

1/15

Project 90186 By KMT Date 10/31/90

Location James City County Checked RCS Date 11/14/90

Circle one: Present Developed Pre Development Conditions

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
Kenansville A	woods (Good cover)	30			1,120	
<u>1/ Use only one CN source per line.</u>		Totals =				

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____, Use CN = 30

2. Runoff

Frequency yr
 Rainfall, P (24-hour) in
 Runoff, Q in
 (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3
2	10	100
3.50	6.0	8.0
.06	.07	.42

$$Q = \frac{(P - 0.25)^2}{P + 0.85}$$

$$S = \frac{1000}{CN} - 10$$

S = 23.3

D-2

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project 90186 By KMS Date 10/31/90
 Location James City County Checked RCS Date 11/14/90

Circle one: Present Developed _____
 Circle one: T_c T_c through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T _c only)	Segment ID			
1. Surface description (table 3-1)		woods (light)		
2. Manning's roughness coeff., n (table 3-1) ..		.40		
3. Flow length, L (total L ≤ 300 ft)	ft	200		
4. Two-yr 24-hr rainfall, P ₂	in	3.5		
5. Land slope, s	ft/ft	.0325		
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _c	hr	.49	+	=

Shallow concentrated flow	Segment ID			
7. Surface description (paved or unpaved)		unpaved		
8. Flow length, L	ft	80		
9. Watercourse slope, s	ft/ft	.0438		
10. Average velocity, V (figure 3-1)	ft/s	11.0		
11. $T_c = \frac{L}{3600 V}$ Compute T _c	hr	—	+	=

Channel flow	Segment ID			
12. Cross sectional flow area, a	ft ²			
13. Wetted perimeter, p _w	ft			
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V	ft/s			
18. Flow length, L	ft			
19. $T_c = \frac{L}{3600 V}$ Compute T _c	hr		+	=
20. Watershed or subarea T _c or T _t (add T _c in steps 6, 11, and 19)	hr			.49

Worksheet 5a: Basic watershed data

Project 90186 Location James City County By KMT Date 10/31/90
 Circle one: Present Developed _____ Frequency (yr) _____ Checked RLS Date 11/14/90

Subarea name	Drainage area A_m (mi ²)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rain-fall P (in)	Runoff curve number CN	Run-off Q (in)	$A_m Q$ (mi ² -in)	Initial abstraction I_a (in)	I_a/P
	.0019	.49				3.5	77	.06	.0001	4.66	1.33
	.0019	.49				6.0	77	.07	.0001	4.66	.78
	.0019	.49				8.0	77	.42	.0008	4.66	.58

↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
From worksheet 3

↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
From worksheet 2

↑ ↑ ↑ ↑
From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

D-5

3/5

Worksheet 2: Runoff curve number and runoff

Project 90186 By KMS Date 10/31/90

Location James City County Checked RES Date 11/14/90

Circle one: Present Developed Post Development Conditions

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
Kenansville A	Woods (Good Cover)	30			.65	19.5
Kenansville A	Roof/Parking Lot	98			.23	22.54
Kenansville A	Drainfield (Grass)	39			.32	12.48
Totals =					1.2	54.52

^{1/} Use only one CN source per line.

$$CN \text{ (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{54.52}{1.2} = 45.4$$
 Use CN = 45

2. Runoff

Frequency yr
 Rainfall, P (24-hour) in
 Runoff, Q in
 (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3
2	10	100
3.50	6.0	8.0
0.1	0.8	1.75

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project 90186 By KMS Date 10/31/90

Location James City County Checked RES Date 11/14/90

Circle one: Present Developed

Circle one: T_c T_c through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T _c only)	Segment ID	
1. Surface description (table 3-1)	Grass (Dense)	
2. Manning's roughness coeff., n (table 3-1) ..	.24	
3. Flow length, L (total L < 300 ft)	200	ft
4. Two-yr 24-hr rainfall, P ₂	3.5	in
5. Land slope, s045	ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _c29 +	=

Shallow concentrated flow	Segment ID	
7. Surface description (paved or unpaved)		
8. Flow length, L		ft
9. Watercourse slope, s		ft/ft
10. Average velocity, V (figure 3-1)		ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T _c	— +	=

Channel flow	Segment ID	
12. Cross sectional flow area, a		ft ²
13. Wetted perimeter, p _w		ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r		ft
15. Channel slope, s		ft/ft
16. Manning's roughness coeff., n		
17. $v = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V		ft/s
18. Flow length, L		ft
19. $T_c = \frac{L}{3600 V}$ Compute T _c	— +	=
20. Watershed or subarea T _c or T _t (add T _c in steps 6, 11, and 19)		hr .29

Worksheet 5a: Basic watershed data

Project 90186 Location James City County By RMT Date 10/31/90
 Circle one: Present Developed Frequency (yr) _____ Checked PCS Date 11/14/90

Subarea name	Drainage area A_m (mi ²)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rain-fall P (in)	Runoff curve number CN	Run-off Q (in)	$A_m Q$ (mi ² -in)	Initial abstraction I_a (in)	I_a/P
	.0019	.29				3.5	45	0.1	.0002	2.444	.70
	.0019	.29				6.0	45	0.8	.0015	2.444	.41
	.0019	.29				8.0	45	1.75	.0033	2.444	.31

↑↑↑↑↑↑↑↑↑↑
From worksheet 3

↑↑↑↑↑↑↑↑↑↑
From worksheet 2

↑↑↑↑
From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

D-5

7/15

RICKMOND ENGINEERING, INC.

1643C MERRIMAC TRAIL
 WILLIAMSBURG, VA 23185
 (804)229-1776 or (804)898-4149
 FAX NUMBER (804)220-9370

JOB 90186
 SHEET NO. 9 OF 15
 CALCULATED BY HMJ DATE 11/7/90
 CHECKED BY RCS DATE 11/14/90
 SCALE _____

Determine Q_{out} for Infiltration Basin

Soil Type: Kenansville (Soil Group A, Loamy Sand)

Table 6.2: Soil Limitations For Infiltration Basins

From Controlling Urban Runoff:
 A Practical Manual for Planning & Designing Urban BMP's

SOIL TYPE	MINIMUM INFILTRATION RATE (fc--inches/hr)	SCS SOIL ¹ GROUP	MAXIMUM DEPTH OF ² STORAGE (inches)	
			48 hrs	72 hrs
Sand	8.27	A	397	595
<u>Loamy Sand</u>	<u>2.41</u>	<u>A</u>	<u>116</u>	<u>174</u>
Sandy Loam	1.02	B	49	73
Loam	0.52	B	25	37
Silt Loam	0.27	C	13	19

¹ Sandy Clay Loams, Clay Loams, Silty Clay Loams, Sandy Clay, Silty Clay, and Clay Soils are not included as these soil types are all NOT FEASIBLE for infiltration basins.

² Maximum Depth in the Basin that can drain completely within 48 or 72 hours after a storm, given the soil infiltration rate.

	<u>C</u>	<u>A</u>	<u>CA</u>
Road	.90	.23	.21
Woods	.10	.65	.07
Grass	.10	.32	.03
		<u>1.20</u>	<u>.81</u>

Discharge: $Q_o = (2.41 \text{ in/hr}) \left(\frac{1 \text{ ft}}{12 \text{ in}} \right) (1,609 \text{ ft}^2) \left(\frac{1 \text{ hr}}{3600 \text{ s}} \right)$

$Q_{out} = .090 \text{ cfs}$

RICKMOND ENGINEERING, INC.

1643C MERRIMAC TRAIL
 WILLIAMSBURG, VA 23185
 (804)229-1776 or (804)898-4149
 FAX NUMBER (804)220-9370

JOB 90186
 SHEET NO. 10 OF 15
 CALCULATED BY HMT DATE 11/11/90
 CHECKED BY RCS DATE 11/14/90
 SCALE _____

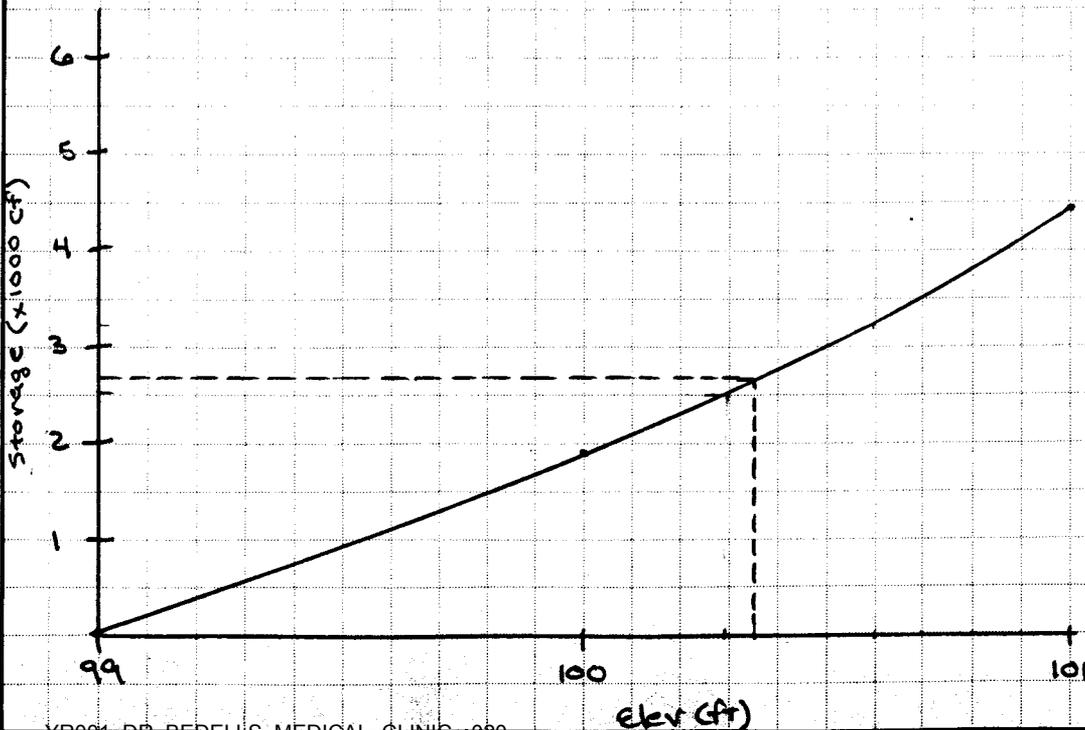
From Waller Method

2yr Storm
 $CA_{dev} = 0.31$
 $T_{cep} = 17.4 \text{ min}$
 $Q_{out} = .090$

$\checkmark = 2684 \text{ of}$

Stage - Storage

Elev (ft)	Δ Elev (ft)	Area (ft ²)	Increm Vol (ft ³)	Accum Vol (ft ³)
99	0	1609	0	0
100	1	2199	1904	1904
101	1	2879	2539	4443



RICKMOND ENGINEERING, INC.

1643C MERRIMAC TRAIL
WILLIAMSBURG, VA 23185
(804)229-1776 or (804)898-4149
FAX NUMBER (804)220-9370

JOB 99186
SHEET NO. 11 OF 15
CALCULATED BY RMT DATE 11/2/90
CHECKED BY RCS DATE 11/14/90
SCALE _____

Determine outlet pipe to pass 10yr storm:

$$Q_{10} = .45 \text{ cfs}$$

$$H = 101 - 99.5 = 1.5' \quad (\text{assume outlet pipe } 12'')$$

$$Q = cA \sqrt{2gh}$$

$$.45 = .62A \sqrt{2(32.2)(1.5)}$$

$$A = .074 = \pi r^2$$

$$r = .15' \quad \text{use } 12'' \text{ dia. CMP}$$

TABLE 2

12/15

**BMP POINT SYSTEM FOR EVALUATION
ACCEPTABLE STRUCTURAL BMPS**

Acceptable BMP	Average Total P Removal Efficiency	BMP Points
A. EXTENDED DRY DETENTION		
(1) Design 2 (6-12 hrs):	20%	4
(2) Design 3 (24 hrs):	30%	6
(3) Design 4 (shallow marsh):	50%	9
B. WET POND		
(1) Design 5 (0.5 in/imp. ac):	35%	6
(2) Design 6 (2.5 V):	40%-45%	8
(3) Design 7 (4.0 V):	50%	9
C. INFILTRATION (TRENCH, BASIN, POROUS PAVEMENT)		
(1) Design 8 (0.5 in/imp. ac):	50%	9
(2) Design 9 (1.0 in/imp. ac):	65%	10
(3) Design 10 (2-yr storm):	70%	11
D. GRASSED SWALE		
(1) Design 15 (check dams)	10%-20%	2
E. WATER QUALITY INLET		
(1) Design 11 (400 cu ft/imp. ac):	*	2

* To be used upstream of detention basin or infiltration system to enhance pollutant removal.

NOTE: A weighted total of 10 points is required for the development plan to achieve BMP compliance.

TABLE 4
 WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

<u>BMP</u>	<u>BMP Points</u>		<u>Fraction of Site Served by BMP</u>		<u>Weighted BMP Points</u>
Infiltration Basin					
Design # 10	11	x	.68	=	7.5
		x		=	
		x		=	
		x		=	
TOTAL WEIGHTED STRUCTURAL BMP POINTS:					

B. NATURAL OPEN SPACE CREDIT

<u>Fraction of Site</u>			<u>Natural Open Space Credit</u>		<u>Points for Natural Open Space</u>
.26	x		10	=	2.6

C. TOTAL WEIGHTED POINTS

<u>7.5</u>	+	<u>2.6</u>	=	<u>10.1</u>
Structural BMP Points		Natural Open Space Points		TOTAL

RCS 11/14/90



CULVERT DESIGN
Entrance Culvert
Roadside Ditch

$c = \underline{.18}$

$A = \underline{.49}$ Ac.

OVERLAND FLOW

Woodland
 Road

C	A	CA
.05	.41	.02
.90	.08	.07
	<u>.49</u>	<u>.09</u>

$L = \underline{200}$ ft.

$S = \underline{3.0}$ %

$T_c = \underline{21}$ min.

CHANNEL FLOW

$H = \underline{2}$ ft.

$L = \underline{215}$ ft.

$T_c = \underline{3}$ min.

$T_c = \underline{24}$ min

$i_{10} = \underline{4.1}$ in/hr

$Q = CAi = (\underline{.18})(\underline{.49} \text{ Ac.})(\underline{4.1} \text{ in/hr})(C_f |)$

C_f for storms 25 yr+
 (VDOT Manual Pg 1-11)

$Q = \underline{.36}$ cfs

$Inv_1 = \underline{99.19}$

$L = \underline{120}$ ft.

$Inv_0 = \underline{98.59}$

$S = \underline{0.5}$ %

$HW = \underline{1.89}$ ft.

INLET CONTROL

$D = \underline{15}$ in. or 1.25 ft.

$HW/D = \underline{.3}$

$HW = (\underline{1.25} \text{ ft.})(\underline{.3}) = \underline{.38} \text{ ft.} < \underline{1.89} \text{ ft.}$

RICKMOND ENGINEERING, INC.

1643 C Merrimac Trail
WILLIAMSBURG, VIRGINIA 23185
(804) 229-1776
(804) 875-1785

JOB 90186
SHEET NO. 15 OF 15
CALCULATED BY KMS DATE 11/7/90
CHECKED BY RCS DATE 11/14/90
SCALE _____

OUTLET CONTROL

$$d_c = .23$$

$$h_o = \frac{d_o + D}{2} = \frac{.23 + 1.25}{2} = .74$$

$$S_o L = (.005)(120) = .60$$

$$d_n = .25$$

$$\frac{d}{D} = .20 \quad \frac{r}{D} = .1206$$

P.E. Manual Pg 3-43

$$R = .15$$

$$v = 1.98$$

$$H = \left(1 + k_e + \frac{29n^2 L}{R^{4/3}}\right) \frac{v^2}{2g} = .34$$

$$HW = H + h_o - S_o L = .48 \quad < 1.89$$

Outlet Central Governors

Use 15" RCP

Date Record Created:

Created By:

WS BMPNO:

YR001

Print Record

WATERSHED ~~m~~ **YR**

BMP ID NO ~~01~~ **001**

PLAN NO S-106-90

TAX PARCEL (14-3)(3-10B)

PIN NO 14303000010B

CONSTRUCTION DATE 11/16/1993

PROJECT NAME Dr. Bedell's Medical Clinic

FACILITY LOCATION 4622 Rochambeau Drive

CITY-STATE Williamsburg, VA

CURRENT OWNER Kevin R. Bedell

OWNER ADDRESS 4622 Rochambeau Drive

OWNER ADDRESS 2

CITY-STATE-ZIP CODE Williamsburg, VA 23188

OWNER PHONE

MAINT AGREEMENT Yes

EMERG ACTION PLAN No

PRINTED ON
Wednesday, March 10, 201
1:41:06 PM

MAINTENANCE PLAN

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

SVC DRAIN AREA acres

SERVICE AREA DESCRI

IMPERV AREA acres

RECV STREAM

EXT DET-WQ-CTRL

WTR QUAL VOL acre-ft

CHAN PROT CTRL

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

GEOTECH REPORT

No

0

COMM

INFILTRATION

C3 Infiltration Basin .5

11

1.2

No

0.1

No

0

No

No

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARRL DESC

OTLT BARRL SIZE inch

EMERG SPILLWAY

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs

10-YR OUTFLOW cfs

REC DRAWING

CONSTR CERTIF

INTERNAL RATING

MISC/COMMENTS

CMP

15

No

101

0.06

0.45

No

No

Inspected by:

3

Get Last BMP No

Return to Menu

Additional Comments:

